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XXIV.—*On the Animal and Operculum of Georissa, W. Blanford, and on its relations to Hydrocena, Parreyss; with a Note on Hydrocena tersa, Bens., and H. milium, Bens.* By WILLIAM T. BLANFORD, A.R.S.M., C.M.Z.S., &c.

[Plate XVI.]

IN the 'Annals and Magazine of Natural History' for June 1864, ser. 3. vol. xiii. p. 463, I pointed out that some small land-shells from the Khasi Hills and Burma, described by Mr. Benson as species of *Hydrocena*, differed so much in the characters of the animal and operculum from the other forms classed in that genus by Pfeiffer and other conchologists, that it was necessary to found a new genus for their reception; and I suggested that this genus, which I proposed to call *Georissa*, might be an ally of *Helicina*, which it resembled in the absence of spiral structure in the operculum. Recently Capt. Godwin-Austen has had opportunities of examining living specimens of *Georissa sarrita*, Bens., in the Khasi Hills, and he has very kindly placed his drawings at my disposal, calling attention to one point which I had overlooked: this is the existence of a projection on the inner side of the operculum, somewhat resembling that in *Rissoina*. This projection is so brittle that, unless great care be used in extracting the operculum, it is sure to be broken, as it was in the two or three specimens which I examined in 1864.

On hearing of this, I reexamined the opercula of the three species of *Georissa* of which I possessed specimens, viz. *G. pyxis*, Bs., *G. frustillum*, Bs., and *G. sarrita*, Bs., and found the projection in all, varying slightly in form.

Both Capt. Godwin-Austen and I have also examined the lingual teeth, and found that, although they belong to the Rhipidoglossate type, they differ entirely from those of *Helicina* and its allies. Capt. Godwin-Austen could detect no teeth

in the central portion of the lingual membrane of *Georissa sarrita*; in that of *G. frustillum* I saw, with some difficulty, long conical spikes, like needle-points, about four in each row, somewhat irregularly placed at a distance from each other. They appear to be no more regular in number than in position; occasionally there are more than four, at other times some are obsolete. The rows of lateral teeth are extremely oblique, and consist of about ten distinctly tricuspid teeth near the centre, passing gradually, as they diverge from it, into simple hooks, which are very numerous. In *G. sarrita*, Capt. Godwin-Austen represents the lateral teeth as bicuspid.

In *Georissa pyxis* I found the tentacles to be represented by very blunt, almost hemispherical lobes, with the eyes at their outer bases. Capt. Godwin-Austen's drawings of *G. sarrita* represent no tentacular projections whatever, the eyes being sessile on a kind of frontal lobe, much as in *Amphibola*. The difference is very trifling, as the rounded lobes observed by myself might easily unite to form one slight frontal projection. The extreme minuteness of the animals necessitating the employment of a microscope for their observation, makes it difficult to ascertain the exact form of the soft parts, especially as the animals only emerge very little from the shell.

With reference to these additional observations, some change in the generic character becomes necessary. The following may be suggested:—

Genus GEORISSA.

Testa minima, imperforata vel vix perforata, conica, succinea, spiraleriter sulcata vel striata, apertura fere semicirculari vel semiovata, columella callosa.

Operculum ovatum, haud spiratum, excentrice striatum, testaceum, transparens, processu elongato intus haud procul a basi marginis interni munitum.

Animal parvum; tentaculis hemisphaericis (v. connatis?); oculis sessilibus; pede brevi, rotundato, operculum in medio dorso juxta aperturam ferente.

It is evident that neither in the shell, operculum, animal, nor lingual dentition is there sufficient resemblance to *Helicina* to confirm the position I at first suggested for the genus as the type of a subfamily of the Helicinidæ. But I think that the true affinities of *Georissa* can now be clearly ascertained.

Subsequently to the publication of my paper in the 'Annals' for 1864, Von Martens pointed out, in the 'Malakozologische Blätter' for the same year, that the type of the genus *Hydrocena* of Parreyss, *H. cattaröensis*, Pfr., differs entirely from

the numerous species classed with it by Pfeiffer, H. and A. Adams, and Gray. The latter, in the British-Museum Catalogue, places it in *Realia*; Pfeiffer, who is followed by H. & A. Adams, retains it as the type of a genus which he places next to *Realia*, but associates with it a number of species belonging, some of them, as Von Martens shows, to *Assimineæ*, others to *Omphalotropis** or an allied genus. It is curious that Pfeiffer, who usually attaches rather too much importance to the characters of the operculum, should have overlooked the peculiarities of that of *Hydrocena cattaroënsis*, which he simply describes as "Operc. paucispirum, rubellum" (Mon. Pncum. Viv. Supp. i. p. 160), although it is figured by Küster in the second edition of Martini and Chemnitz, and the description and figure are quoted by Pfeiffer† with his usual accuracy. The operculum is in almost every respect similar to that of *Georissa*; and as Küster's description of the genus appears to have been generally overlooked, it may be as well to append a translation of it, in order to show the connexion of the two genera. The description, in German, occurs at p. 80 of part i. 21, of Martini and Chemnitz:—

"Shell small, imperforate, conical, thin, with a broad conical spire, scarcely exceeding the aperture in height; the whorls few in number, slowly increasing, convex. Aperture ovate, angulate above as in *Paludina*, edges united by a thin callus resting on the penultimate whorl; peristome straight, not expanded or thickened; columella somewhat concave, with a free reflected edge below; umbilicus filled by a callus, which, when highly magnified, exhibits a very fine granular wrinkled sculpture (as in *Neritina*).

"The operculum is of peculiar construction, widely different from that of *Paludina* ‡. It is calcareous, and has a nucleus,

* In the original publication of his 'Monographia Pneumonopomorum Viventium,' Pfeiffer quite correctly excluded *Hydrocena cattaroënsis* from the Cyclostomacea, retaining *Omphalotropis rubens*, Quoy & Gaimard, and its allies, which belong to the order, unless, as is possible, they are terrestrial Rissoidæ. It is strange that in the first supplement to the monograph, after Küster and Troschel had described and figured the animal and tongue of *Hydrocena*, Pfeiffer should have reintroduced it amongst his Cyclostomacea, and have retained it in the same position in the second Supplement.

† Pfeiffer, in his second Supplement, refers to a description of the animal of *Hydrocena* by A. Adams, in the Ann. & Mag. Nat. Hist. for 1861, vol. vii. p. 196. The animal there described, however, is that of one of the land-shells allied to *Omphalotropis* which have been incorrectly referred to *Hydrocena*.

‡ *Hydrocena* is classed with *Paludina* and *Volvata* in Küster's Monograph. Hence the allusions.

which occasionally shows a trace of spiral structure at the lower part of the left side; additions are made to the left side and the apex, so that the striæ seen running from the nucleus are bent over in an open curve above. Inside, at the nucleus, there is a projection of considerable size, with a blunt termination, which increases the resemblance, already existing in other characters, to the opercula of the smaller *Neritinae*.

“The animal is short, the foot rounded off and broader in front; the head separated from it and but slightly emarginate and broad when at rest, but when the animal is creeping it is stretched out somewhat like a proboscis. On the top of the head are two short triangular tentacles, bearing large black eyes on the upper bases.

“The operculum is fastened on the hinder portion of the foot, as in *Paludina*.”

The accompanying figures are not good; and if a specimen in my possession be authentic (as I have every reason to believe it is), they convey a very inaccurate idea of the form of the shell and its colour, which is of the same peculiar amber tint as in *Georissa*, and resembles that of some of the more deeply coloured *Succineæ*. I am therefore induced to doubt if the representations of the operculum* are exact. The only important distinction shown by the latter from that of *Georissa* is in the striation, which, as described, shows a different mode of increase in the operculum. The internal process is very nearly the same.

So far as the shell is concerned, there is evidently no distinction of any consequence between the two types; and the differences presented by the operculum are at the most sub-generic; but the distinctions shown by the animals are of some importance. They are, briefly (if Küster's figures and description are trustworthy, and I can certainly see no reason why any shortcomings in the former should imply inaccuracy in the latter):—that, to use Pfeiffer's terms, *Hydrocena* is opisophthalmate, while *Georissa* is ectophthalmate, the former having the eyes above the base of the tentacles, the latter at the side; and also that in *Hydrocena* the operculum is carried on the end of the foot, at some distance from the aperture—in *Georissa* close to the aperture, the foot being only extended a very short distance behind, and being generally shorter and rounder in the latter genus.

Were this the only distinction, I should be much disposed, taking into consideration the marked similarity of the shell

* I have endeavoured to extract the operculum in the only specimen of *Hydrocena caltaroënsis* which I possess; but it is too deeply inserted in the shell to be removed without breaking the aperture.

and operculum, to believe that either Küster or I had committed some oversight in the examination of the animals, and that they are in reality alike. But the circumstance that *Hydrocena* is a truly marine species, living in water, whilst all the species of *Georissa* are found on hills at a distance from the sea*, renders it probable that a difference really exists; and the characters of the lingual ribbon tend to bear out that distinction.

The lingual teeth of *Hydrocena* have been figured by Troschel in the 'Gebiss der Schnecken,' vol. i. Taf. 6, and described at page 83. They differ from those of *Georissa* in the characters of the central teeth, which, however, are rudimentary in both forms, and have not been clearly made out in *Georissa*.

Troschel regards the genus *Hydrocena* as forming the type of a family of Mollusca with affinities to the Helicinidæ and the Neritinidæ—a view which appears best to meet the circumstances of the case. If, therefore, the genus *Georissa*, as a land-shell, be kept distinct from *Hydrocena*, it will form a second genus of the family.

But I cannot conclude without calling attention to the surprising resemblance shown in this case by a true land-mollusk to an undoubted marine form, as one more addition to the numerous arguments against separating the Cyclostomidæ, Cyclophoridæ, and Helicinidæ from their natural allies living in fresh or salt water.

Note on Hydrocena tersa, Benson, and H. milium, Bens.

Two minute shells were described by Mr. Benson in the 'Annals' for 1853 (ser. 2. vol. xi. p. 285), under the names of *Cyclostoma tersum* and *C. milium*. They were found in moss brought from the Khasi Hills. Subsequently, in 1856 (*op. cit.* vol. xvii. p. 232), Mr. Benson referred both species, together with *C. sarritum*, to the genus *Hydrocena*. When, in 1864, I proposed the genus *Georissa* for the last-named species and its allies, I suggested that *C. tersum* and *C. milium*, which I had never seen, might perhaps belong to it. Neither the animals nor opercula of these two species were known to Mr. Benson, nor have they hitherto been described.

I am indebted to Capt. Godwin-Austen for specimens of a shell which I have no hesitation in referring to Mr. Benson's *Cyclostoma tersum*, and for figures of the animal, operculum, and lingual ribbon. The original specimen was probably weathered; when fresh, the shell is of the colour of horn.

* *G. sarritu* is found at a height of 4000 feet above the sea, on the Khasi Hills.

The operculum is horny, extremely thin, and very difficult to isolate; it appears to be paucispiral. The animal, as represented in Capt. Godwin-Austen's drawing, bears a most remarkable resemblance to that of *Assiminea*, the eyes being above and nearly at the tips of short blunt tentacles. The lingual teeth are figured by Capt. Godwin-Austen as 5, ranged 2.1.2, the outermost lateral teeth being probably rudimentary.

The shell on the whole resembles *Acicula* more than any other genus of operculated land-shells; and as the characters both of the animal and operculum approach those of that genus, the present species may with probability be placed in it. The teeth of *Acicula* have not, so far as I am aware, been examined. Those of *Assiminea* are very different from Capt. Godwin-Austen's drawings.

Acicula tersa is distinguished from all the typical species of the genus by its shell being conico-ovate instead of subcylindrical, and, which is of much more importance, by the eyes being pedunculated, and not sessile; for the position of the eyes nearly at the tip of the tentacles shows that they are situated on pedicels which are connate with the tentacles. The differences are not generic; but I think they are subgeneric, and I would therefore propose to make the present species the type of a subgeneric section, with the name of *Acmella*. It is just possible that *Cyclostoma striata*, Quoy and Gaimard, referred by Gray and Pfeiffer to *Acicula*, may belong to the same subgenus.

The following characters require to be added to those given by Mr. Benson:—

Testa cornea; operculum corneum, tenuissimum, paucispirale, nucleo sinistrali.

As regards *Cyclostoma milium*, I fear that I can add nothing very certain. Amongst the very numerous small forms of Mollusca collected by Capt. Godwin-Austen I have seen no shell which I can with certainty refer to Mr. Benson's description. I at first thought that a small aberrant *Cyathopoma*, collected near Cherra Poonjee, might be the species; but it is ribbed spirally, while Mr. Benson's species is described as smooth; and the proportions differ to too great a degree from those of *C. milium* to allow of its being the same. All that can certainly be asserted is that *C. milium* must, on account of its form and characters, be removed from the genera *Hydrocena* and *Georissa*, and that it may be a *Cyathopoma*. It may be an immature shell; but if so, I am unable to suggest to what species it can belong.

The accompanying figures, with the exception of the oper-

culum of *Georissa sarrita*, which is by my brother, are drawn by Capt. Godwin-Austen.

EXPLANATION OF PLATE XVI.

Fig. 1. Georissa sarrita, Benson, sp.; shell, magnified about 18 diameters; the mouth is a little turned away: 1 *a*, operculum, seen from the inside, showing the projection, magnified; 1 *b*, animal, sketched in three different positions, magnified; 1 *c*, lingual ribbon, magnified 250 diameters; 1 *d*, teeth near the centre, still further enlarged; 1 *e*, uncini near the margin.

Fig. 2. Acicula (Acmella) tersa, Benson, sp.; shell, magnified about 15 diameters. The specimens sent to me by Capt. Godwin-Austen differ in being more conical and less ovate, but otherwise agree well. The shell perhaps varies slightly in form. 2 *a*, operculum, magnified. A small portion of the foot (*f*) remained attached, and could not be removed, on account of the minuteness and thinness of the operculum. 2 *b*, animal, magnified, sketched in three different positions. 2 *c*, lingual ribbon, greatly magnified; the outer teeth to the left partly turned back.

Calcutta, December 26, 1868.

XXV.—*The Rabbit (Lepus cuniculus) as known to the Ancients.*

By the Rev. W. HOUGHTON, M.A., F.L.S.

THE rabbit appears to have been but little known to the ancients; the old inhabitants of Greece and Rome were not plagued, as tenant farmers in this country are, with this prolific little pest to agriculture. The rabbit in its wild state is essentially a European animal. To the ancient Jews it was entirely unknown; there is no mention of it in the Bible; it is generally acknowledged that the Hebrew word (*Shâphan*) rendered "coney" by the authorized version denotes the *Hyrax syriacus*: several species of hare have been described as occurring in the Bible-lands, but no kind of native rabbit. Rabbits were noticed by Russell as occurring rarely in the vicinity of Aleppo; but they had been introduced from Europe. If we turn to Aristotle, we shall find that, in all probability, the rabbit was quite unknown to him, though he sometimes speaks as if he were alluding to this animal. The words he uses are *λαγωὸς* and *δασύπους*: the former word occurs but once in his 'History of Animals,' viz. in a passage (viii. 27. § 4) in which he mentions that the *λαγωὸι* of Egypt are smaller than those of Greece. Of the *δασύπους* he says:—it is prudent and timid (i. 1. § 15); it is retromingent (ii. 3. § 4); it is one of those animals which, having teeth in both jaws, have cotyledons in the pregnant uterus (iii. 1. § 15); its blood, like that of the stag, does not coagulate so completely as that of many other animals (iii. 6. § 1); it alone of all animals has